

Claims

1. A copolymer comprising the following monomers:

acrylic acid or an ester thereof in the range 40 to 80 % by weight;

methacrylic acid or an ester thereof in the range 20 to 60 % by weight; and

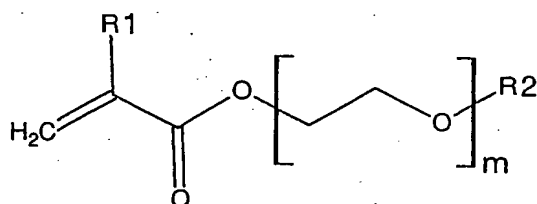
5 a polymerizable surfactant in the range 0.01 to 9 % by weight.

2. A copolymer according to claim 1 comprising the following monomers:

ethyl acrylate in the range 40 to 80 % by weight;

methyl methacrylate in the range 20 to 60 % by weight; and

10 a monomer characterized by formula I:



(I)

15 wherein m is an integer from 1-55,

R1 is hydrogen or methyl, and

R2 is hydrogen or a carbon chain having 1 to 20 carbon atoms
in the range 0.01 to 9 % by weight.

20 3. An aqueous polymer dispersion obtainable by polymerization of the following monomers in water in the presence of an emulsifying agent:

acrylic acid or an ester thereof in the range 40 to 80 % by weight;

methacrylic acid or an ester thereof in the range 20 to 60 % by weight; and

25 a polymerizable surfactant in the range 0.01 to 9 % by weight.

4. An aqueous polymer dispersion obtainable by polymerization of the following monomers in water in the presence of an emulsifying agent:

ethyl acrylate in the range 40 to 80 % by weight;

methyl methacrylate in the range 20 to 60 % by weight;

and a monomer of formula I as described in claim 1 in the range 0.01 to 9 % by weight.

- 5 5. An aqueous polymer dispersion obtainable by polymerization of the following monomers in water in the presence of an emulsifying agent:

acrylic acid or an ester thereof in the range 40 to 80 % by weight;

methacrylic acid or an ester thereof in the range 20 to 60 % by weight; and

a polymerizable surfactant in the range 0.01 to 9 % by weight;

- 10 wherein if the emulsifying agent is an emulsifier with a molecular weight lower than 15 kD then it is partially or fully removed after the polymerization reaction.

6. An aqueous polymer dispersion obtainable by polymerization of the following monomers in water in the presence of an emulsifying agent:

- 15 ethyl acrylate in the range 40 to 80 % by weight;

methyl methacrylate in the range 20 to 60 % by weight;

and a monomer of formula I as described in claim 1 in the range 0.01 to 9 % by weight;

wherein if the emulsifying agent is an emulsifier with a molecular weight lower than 15 kD then it is partially or fully removed after the polymerization reaction.

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7. An aqueous polymer dispersion obtainable by the polymerization of the following monomers in water:

acrylic acid or an ester thereof in the range 40 to 80 % by weight;

methacrylic acid or an ester thereof in the range 20 to 60 % by weight; and

- 25 a polymerizable surfactant in the range 0.01 to 9 % by weight.

8. An aqueous polymer dispersion obtainable by the polymerization of the following monomers in water:

ethyl acrylate in the range 40 to 80 % by weight;
methyl methacrylate in the range 20 to 60 % by weight;
and a monomer of formula I in the range 0.01 to 9 % by weight.

5 9. A film for use in coating pharmaceutical formulations obtainable by removal of water from an aqueous dispersion according to any one of claims 3 to 8.

10. A pharmaceutical formulation comprising:

- a) a pharmaceutical core comprising a pharmacologically active ingredient; and
- 10 b) a film coating comprising a film according to claim 9.

11. A pharmaceutical formulation comprising a pharmacologically active ingredient which is provided in a plurality of beads wherein each of the beads is coated with a film according to claim 9.

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12. A formulation according to either claim 10 or claim 11 wherein the formulation is a controlled release formulation.

13. A formulation according to any one of claims 10-12 wherein the pharmacologically
20 active ingredient has activity in the treatment of cardiovascular or gastrointestinal diseases.

14. A formulation according to any one claim 10-12 in which the pharmacologically active ingredient is a beta-blocking adrenergic agent.

25 15. A formulation according to claim 14 in which the pharmacologically active ingredient is metoprolol or a pharmaceutically acceptable salt thereof.

16. A formulation according to claim 15 in which the metoprolol salt is the tartrate, succinate, fumarate or benzoate salt.

17. A polymer according to either claim 1 or claim 2, or a dispersion according to any one of claims 3 to 8 or a film according to claim 9, or a pharmaceutical formulation according to any one of claims 10 to 16 wherein m is 2-55 in the monomer of formula I.

18. A polymer according to either claim 1 or claim 2, or a dispersion according to any one of claims 3 to 8 or a film according to claim 9, or a pharmaceutical formulation according to any one of claims 10 to 16 wherein the monomer of formula I is defined as m is 4, R1 is hydrogen and R2 has 13 carbon atoms.

19. A polymer according to either claim 1 or claim 2, or a dispersion according to any one of claims 3 to 8 or a film according to claim 9, or a pharmaceutical formulation according to any one of claims 10 to 16 wherein the monomer of formula I is defined as m is 10, R1 is hydrogen and R2 has 11 carbon atoms.

20. A polymer according to either claim 1 or claim 2, or a dispersion according to any one of claims 3 to 8 or a film according to claim 9, or a pharmaceutical formulation according to any one of claims 10 to 16 wherein the monomer of formula I is defined as m is 25, R1 is hydrogen and R2 has 18 carbon atoms.

21. A polymer according to either claim 1 or claim 2, or a dispersion according to any one of claims 3 to 8 or a film according to claim 9, or a pharmaceutical formulation according to any one of claims 10 to 16 wherein the monomer of formula I is defined as m is 1, R1 is methyl and R2 is hydrogen.

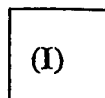
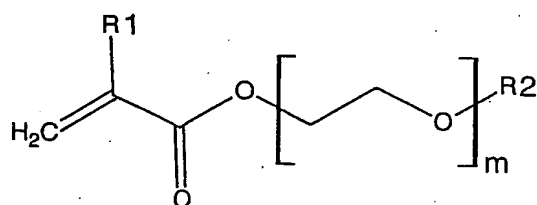
22. A polymer according to either claim 1 or claim 2, or a dispersion according to any one of claims 3 to 8 or a film according to claim 9, or a pharmaceutical formulation according to any one of claims 10 to 16 wherein the monomer of formula I is defined as m is 9, R1 is methyl and R2 is hydrogen.

23. A process for the preparation of a polymer comprising polymerizing the following monomers in water in the presence of an emulsifier:

ethyl acrylate in the range 40 to 80 % by weight;

methyl methacrylate in the range 20 to 60 % by weight.; and

a monomer characterized by formula I:



wherein m is an integer from 1-55,

R₁ is hydrogen or methyl, and

R₂ is hydrogen or a carbon chain having 1 to 20 carbon atoms
in the range 0.01 to 9 % by weight

24. A process according to claim 23 wherein the process is carried out at a temperature in the range of 1 to 100°C.

25. A process to prepare a formulation as claimed in any one of claims 10 to 16

comprising coating the pharmaceutical core or beads with a film coating dispersion as defined in any one of claims 3 to 8.